– The radial fluid stiffness, K_B, increases much faster with increasing shaft eccentricity.

This means that as the rotor moves away from the center of the bearing in the SFCB, the stiffness (and therefore the restoring forces) are much larger and increase much faster. This tends to keep the rotor "self-centered" and also means that the SFCB has significantly better stiffness and load-carrying capacity than conventional bearings, particularly at low eccentricities. Figure 7a shows the Direct Dynamic Stiffness (DDS) for the drive end radial SFCB with the compressor at zero rotative speed. Because the perturbator can be rotated either with or counter to the direction of compressor shaft rotation, both forward and reverse values for DDS are shown, illustrating the symmetry. For illustrative purposes, the system's DDS is shown as two distinct components: the bearing's stiffness, $K_{D(\,Bearing\,)}$, and the casing stiffness, $K_{D(\,Casing\,)}$. Figure 7b shows a similar plot with the compressor running at a constant speed of 7,000 rpm.

The following observations from these figures are noteworthy:

– The bearing provides very high stiffness at zero rotative speed.

– There is virtually no difference in stiffness characteristics between the compressor when stopped and when running at 7,000 rpm. This indicates that the system is extremely stable and that there is no fluid inertia effect or fluid circumferential average velocity ratio (λ) that can cause the system to go unstable.

Summary

Experimental testing on a modified Clark 1M6 compressor resulted in clear understanding of the differences between behavior of a conventional hydrodynamic sleeve bearing and Bently Nevada's new ServoFluid™ Control Bearing. Direct Dynamic Stiffness, λ (lambda), eccentricity ratio, independently adjustable damping, and attitude angle were all observed experimentally using perturbation techniques. The new bearing's design was found to have numerous advantages, including excellent stability from zero through operating speed. It was shown that conventional hydrodynamic bearings rely on their bearing characteristics to be generated at higher eccentricities (journal closer to the bearing wall), while the ServoFluid™ Control Bearing's characteristics are generated by the differential fluid flow across the journal surface – at much lower eccentricities.

More information on the ServoFluid™ Control Bearing is available in the brochure attached to this issue of ORBIT, from your nearest Bently Nevada sales or service professional, or at our website, www.bently.com.

NEW PRODUCT

The wait is over ... System 1™ is here.

For over a year now, we've kept you abreast of our progress as we developed our most ambitious and exciting software program to date – System 1™. We also told you it was worth waiting for. We're pleased to announce that System 1™ is here. Released officially on June 23rd, System 1™ is the host software for our Snapshot™ for Windows® CE portable data collector. However, in the coming months we'll keep you apprised of our continued progress as we integrate Bently Nevada's online systems into this powerful software platform, creating true integration between the online and offline worlds. You see, as the name denotes, System 1™ is *one unified system* for managing all your machinery and related assets. Start with System 1™ as the basis for your portable data collection program, and then grow from there, knowing that connectivity to your Bently Nevada online hardware lies ahead.

For more information on System 1™, visit us on the world wide web at www.bently.com, or contact any one of our over 80 sales and service centers around the world.